

1. Ngambo comes from a family that believes that Health is Wealth. This is practiced in such a way that for every meal they prepare, they accompany it with a juice. The juice is always prepared by the maid **Aunt J** by mixing the passion fruit, water and sugar. **Aunt J** always separated the passion fruit seeds from the mixture and added sugar to make it sweet. One day, **aunt J** went for a trip and she had not prepared juice for that particular day, so Ngambo was asked to prepare the passion fruit juice for the family but the juice he prepared had plenty of passion fruit seeds. The whole family was so surprised on how he made the juice which was full of seeds relative the one that **aunt J** always prepared. Ngambo felt guilty and he became concerned about the matter.



Task. As a s.1 learner who has studied about the Chemistry of mixtures,

- (a) Assist Ngambo to know the process by which the passion fruit seeds can be separated from the mixture.
- (b) Describe to him how he can easily separate the passion fruit seeds from the mixture.
- (c) Explain to him why it is possible to separate the passion fruit juice by the process described above.

2. Sarah's young brother bought ice from the Canteen, on reaching home, mum sent him to the shop to buy sugar and he forgot his ice on the veranda, which is directly heated by the sun. On returning, he found out that all the ice had turned to liquid and flowed, after some time he noticed that the veranda he did not mop was dry and he wondered how it came about.



Task:

As a chemistry student, write a message explaining to him what caused the changes he saw using your knowledge of the kinetic theory of matter

3. A debate struck amongst senior one learners at Riverside College Tirinyi about Chemistry as one of the prestigious subjects studied as they were relating it to different activities in the society. One group of learners claimed that those who study chemistry only become chemistry teachers while another group claimed that there are many careers related to the study of chemistry.



Task.

As a chemistry learner,

- Assist the learners to identify any three other careers related to the study of chemistry in order to settle their argument.
- Briefly describe how the chemistry knowledge is applied in the careers identified in (a) above.

4. Kinetic theory of matter states that “***matter consists of very smallest invisible particles in the state of continuous random motion***” A teacher instructed S.2 students to come up with every day examples demonstrating the existence of particles in matter.

Owen; a S.2 student presented his example before the whole class. His presentation was “when ***someone closes him or herself in a dark room with closed windows and doors and looks into a ray of light penetrating through one simple hole in one piece of iron sheet, dust particles are seen moving in a zig zag pattern***” the teacher confirmed Owen's findings.

- State why the dust particles are seen moving in zig zag pattern.
 - Give a reason for your answer in (a)
 - What conclusion can be drawn from Owen's simple experiment?
 - State what would be observed within the ray of light when the room gets hotter?
 - Explain your observations in (d) above.
5. Eva was in a conversation with her young brother and suddenly her brother talked of where the rain comes from, her brother thinks that rain is sent by God to us, a concept which seems to be right since rain is not made by man. Eva told her brother that he is right though using knowledge of chemistry we can further explain how rain comes to be formed since it is recyclable.

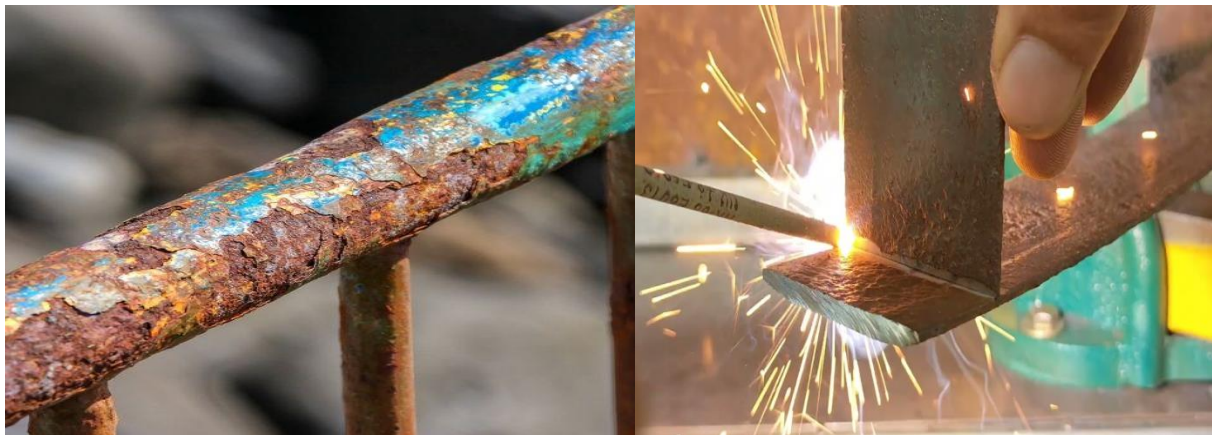


Task:

As a chemistry student;

- Write a short message helping Eva to give a precise explanation to her brother.

6. Nsegera is a welder who works with binding iron metals to make windows and doors at Nsegera and sons metal fabrications. He has a small store which cannot accommodate his metals and therefore leaves most of them outside. After a week, he found his metals developing a reddish-brown appearance. The metals had weakened and could no longer be used to make windows.



TASK:

As a chemist, design an experiment to demonstrate the occurrence and advise Nsegera on the ways through which he can avoid the occurrence. Hence explain the Observation. (Include the equation for the reaction).

7. James wanted to celebrate his birth day with well inflated decorated balloons, he decided to inflate all the balloons 3 days before to the birthday and kept all of them in one room. Early in the morning on the birthday, he wanted to do the decoration but found when all the balloons had shrunk (reduced in size), this greatly left him wondering how that happened.



Task

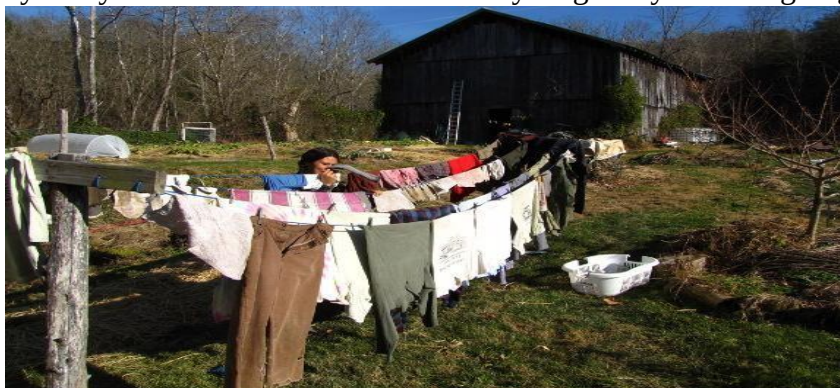
As a senior **two learner** who now understands kinetic theory of matter, clearly state it and advise James on why that happened.

8. Senior one students were carrying out an experiment to investigate what happens when solid substance P is heated. Doreen's group obtained and recorded the following results of temperature changes together with time taken.

Time (minutes)	0	1	2	3	4	5	6	7	8	9	10	11	12
Temperature (°C)	-10	0	0	10	20	30	40	50	60	80	80	80	90

- a) Plot a graph of temperature of the substance versus time.
 b) Use the graph to determine the;
 i) Freezing point of the substance **P**.
 ii) Boiling point of substance **P**.
 c) Draw and comment on the arrangement of particles of substance **P** at;
 i) -10°C ii) 90°C iii) 20°C

d) Akello a senior one student washed her school uniform and hanged them in a line. Unfortunately, the weather became too cold. Immediately Akello was worried a lot about what she will wear the following day at school because she knew that the school uniform will not get dry and yet she does not want to miss any single day without going to school.



Task

Help Akello to clear off her doubts and worries.

9. River Mpologoma is one of the natural sources of water people of Tirinyi use. In this community, some people stay near this river and the tap water people use from this area is extracted from this river but due to some human activities the water is highly polluted and now people are worried and have stopped using even the tap water. The National Water and Sewage Corporation(NWSC) has organized a workshop to sensitize the people of Tirinyi community about the human activities that pollute the water and how to make this water from river Mpologoma safe for use.

Task.

You have been invited as one of the speakers in this workshop, Make a write up you would use in order to clear up your people's worries and in your write up, explain to them how the water from the river is formed.

10. Okao is in the process of constructing his house without affecting the environment. He wants to build a good strong house; there are various building materials of different quality and properties on the market. However, he does not know the quality of materials to use.



Okao knows that choosing quality materials depends on the nature of the material and has come to you for advice.

Task

Use your chemistry knowledge to;

a) Explain

- i)** Categories of materials.
- ii)** The suitability of the materials.

c) Advise Okao on the choice of materials.

11. Mudhiba, staying in Amoru village in Amuria district is currently living in fear. This is because he has noticed that whenever he uses water from the well for washing clothes and dishes, he happens to use a lot of soap, on top of that, he finds marks on clothes and the dishes. However, this is not the case when he uses rain water or boils water from the well before washing. Abel is really confused, frightened and he is attributing this to witch craft.

Task.

As a chemistry student;

a) Help Mudhiba to;

- i)** Understand the type of water in the well.
 - ii)** Understand how the water from the well is formed.
 - iii)** Know the ions responsible for the effects of that particular water type named above.
- b) Advise Mudhiba on the possible ways of removing those ions and improve the quality of that water from the well. (Use chemical equations to illustrate your work).**

12. Abu, a student of Mbale secondary school is trying to understand the occurrence of carbon in the environment. He was doing research and found out that, pure carbon is found in the form of diamond and impure carbon as graphite and that carbon is allotropic and therefore has allotropes.

Task

As a S.3 learner who has studied chemistry;

a) Help Abu to;

- i)** Understand the meaning of allotropes.
- ii)** Point out the (3) allotropes of carbon.
- iii)** Cite out the properties of diamond and graphite, and in each case give two uses of each.

b) Inform Abu on any other element that has allotropes as carbon does, hence give the allotropes of that element.

13. Forest resort hotel abruptly caught fire and was burning seriously. The manager of the hotel decides to call for a fire rescue team to come and help put off the fire. Unfortunately, the leader of the team finds that the gas they normally use got depleted and was looking for someone who could help manufacture the gas in order to be used.



Task

As a S.3 chemistry learner;

a) i) Identify the gas used in putting off fire.

ii) What is the percentage composition of this gas in the atmosphere?

b) With the use of your school laboratory apparatus, help the fire rescue team to manufacture the gas to be used.

c) Explain the chemical properties of this gas.

14. Zinc sulphate is a common, soluble salt found in *Ora^T* tablets given to patients with Zinc deficient symptoms. As an expert pharmacist at Cipla pharmaceuticals, you have been assigned to guide newly employed pharmacists on how to prepare the pure dry crystals of Zinc sulphate salt that will be used in the tablets.



Task

In your guidance you are required to;

i) State **two (2)** substances from which *Ora^T* can be prepared?

ii) Mention the type of reaction that occurs during the preparation.

iii) Write a well-balanced molecular equation of reactions that occurs.

iv) How can the *Ora^T* tablets be prepared in the laboratory from dilute Sulphuric acid?

v) With an example, mention any other **four (4)** uses of salts in our daily lives.

15. Mr. Omeri Peter a resident of Kumi always instructs his daughter using written messages to go and buy some things from the centre to be used at home. One morning as he was going to work, he left a sheet on the table instructing his daughter to go and buy an alkane. The daughter having little knowledge didn't know what an alkane is and what it's used for. She was now living in fear and doubts that what if her father had sent her to buy poison or an acid.

As a student who has studied carbon in life, help Mr. Omeri's daughter to clear off her doubts.

16. In a certain family, there struck a wrangle between the father, mother and their son James who is currently studying in S.2 at Rwenzori High school in Kasese. The discussion was about the effectiveness of the new laundry soap they purchased for their house hold. The son claimed that every time he washed his uniform shirt using the soap which the father brought, stains could remain in the shirt even when he followed the guidelines of using the soap. The father claimed that it was an issue with the person washing while the mother claimed it was due to the water James used during washing. James decided to investigate the chemistry behind this challenge.



Task.

- (a) As a S.3 learner who has studied the chemistry of detergents,
 - (i) Explain to James the category of the soap he used during washing.
 - (ii) Describe to the son how the detergent he used works.
 - (iii) Advise the Family on the potential reasons why some stains may not be fully removed by the detergent and suggest possible alternative cleaning methods.

17. Most of the youth in Kanapa village in eastern Uganda are involved in cutting trees, burning the wood and products for cooking. Residents are frustrated with toxic fumes from the activities, they are curios and beseech to know the nature and composition of the product and why the activities.



The chairperson has contacted you as a chemistry student for guidance on what she is about to communicate in the community meeting.

Task

a) Guide the chairperson on;

i) Nature of the product.

ii) Composition of the product.

b) Her concern is “can those products have any impact to their community?” If so can this impact be reduced? Advise her.

c) Can these activities benefit the residents? Take her through.

18. Fertilizers are added often to boost soil productivity. One of such is ammonium nitrate which is often imported at high costs. To boost the local production of ammonium nitrate. Government recently cleared Bloom Uganda limited set up ammonium nitrate production plant in one of the villages in Mubende district with minimal environmental impact.

The locals however don't know the process of production will be carried out.



As a result, a radio talk show has been organized at one of the local radio stations to sensitize the locals.

Task;

Prepare a presentation you will make during the talk show if you were invited.

19. The president of Uganda wants to donate fire extinguishers to schools to reduce on the dangers associated with the fire outbreak but the carbon dioxide produced locally is not enough to support the program. He is looking for an investor to set up carbon dioxide processing industry in Jinja industrial area. The investor available now lacks knowledge of how he can carry out the project.

Advise the investor.

20. OBO, a resident of Tukum village a place where they use borehole water, slid, fell and his white shirt became dirty. He decided to use a detergent to clean his shirt. The shirt remained with some brown spots yet he had rinsed it several times.

Task.

As a chemistry student;

- a) Suggest a problem OBO made when choosing a product.
- b) Help OBO understand how the product works.
- c) Advise OBO on the challenges associated with the long term use of the product.

21. In Kasambya sub-county, many people use pit latrines as an area of disposal of human waste. These latrines produce a lot of bad smell whenever it clocks 1:30 to 2:00pm.



Task.

- a) As a S.4 learner, write a report to the people of Kasambya sub-county explaining to them how the bad smell molecules are able to move.
- b) Why the smell increases during a given time?
- c) What advice would you give to them on how they can avoid the bad smell?

22. Soroti general referral hospital in Soroti district has been using chloroform for anesthetic process to make patients unconscious and make operations on them. The supplier of chloroform has stopped and the only alternative they can use is ethanol but they lack knowledge of manufacturing alcohol from local materials in Soroti.



Task.

As a senior **four (4)** student, write a report guiding them on how they can process the alternative mentioned above such that they continue working on patients.

23. We use objects in everyday life made from materials that are either plastics, glasses and metals.

Task

- a) What are the useful properties of plastics?
- b) Plastic waste management is a problem in our communities today. There is poor disposal of plastics in our communities caused by human beings themselves. This is a big threat to human health around the community.



- i) What threats do plastics pose to man and his environment?
- ii) What would be the possible solutions to the threats possessed by plastics to the environment listen in (b (i)) above?

24. Whenever Kawaga would fall sick, he resisted going to hospital and chewed leaves of mangoes, eucalyptus plus a cup full of hot water in which he dissolved seeds of Dutchman's pipe. This time he was infected with cough, flu and fever with convulsions and was rushed to a nearby health facility. His body temperature was high and was given some tablets then an injection. Kawaga's condition improved tremendously.

Task

- (a) Point out why Kawaga was rushed to a healthy facility?
- b) Help Kawaga to understand how the tablets he received and the injection work
- c) Advise Kawaga on the long term use of medicine.

25. Constructors abandoned some materials at the construction site which James discovered while leveling the compound. They included some metal pieces, polyethene and cloth. Some cloth broke into tiny pieces while others remained intact. James was disturbed on how best to dispose off the materials that remained intact and is seeking for advice from the owner of the building.



Task

Using your knowledge of chemistry;

- (a) Help James;
 - (i) classify with reason the abandoned materials
 - (ii) State the properties of the materials he found abandoned.
- (b) In what ways were the materials suitable for the uses they served?
- (c) Advise James on the impact of the materials on the environment.

26. Electricity connectivity in most parts of Uganda is still very low and rural communities have continued to cut down trees for fuel which is affecting the environment and likely to cause climate change. Kilembe mines can be revived to extract the metal for making electric cables which would benefit the communities despite the impact of the extraction process.

**Task**

Using your knowledge of chemistry, write a presentation explaining how the pure metal can be produced including the impact and benefits of the process.

27. The discovery of crude oil and natural gas in Bunyoro region has caused excitement to people while the neighboring communities are worried about the impact of the extraction process on the environment. The National oil company (UNOC) officials have organized a sensitization meeting with the residents to address their worries.

Task

Using your knowledge of chemistry, make a write up of what the officials would present to the residents.

28. Ogwenrwot constructed a new house but without a garage for his car. Many of his friends wanted to know why he did not include a garage on the house. He told them that it was a technical advice from his engineer. This was insufficient explanation and the friends continued to demand for a better understanding. Secretly like his friends, Ogwenrwot also kept wondering what problems the vehicle causes in the house.

**Task**

As a chemistry learner make a write up to help Kamonte and his friends understand the advice of his engineer.

29. Kamu-Kamu women's saving group have a ten acre forest of eucalyptus trees from which they have been harvesting fire wood to sell in the local market and beyond but could not fetch them enough income. The women decided to cut the trees for wood charcoal. This attracted the National Environment Management Authority (NEMA) officials to stop them. The action taken by Nema authorities was harsh and the women objected to it demanding a clear explanation and alternative ways of benefiting from natural resource.



Task

Using your knowledge of chemistry, help the women understand why NEMA stopped their economic activity.

30. Mary's house maid often prefers using wood charcoal to natural gas for cooking which results in some delays in the preparation of food compared to the days natural gas is used. Mary now wants to know the cause such that the maid can be advised accordingly.

Task

Using your knowledge of chemistry,

- (a) Help Mary;
 - (i) Categorize the product Mary's maid preferred.
 - (ii) Understand how the product works.
- (b) Advise Mary on long term use of the desired product.
- (c) How do the two fuels compare with each other?

31. A donation to the school of sports and games equipment comprised of balls, nets, flags, javelin short put and pressure pumps. The prefect realized the equipment were made of different materials and that their nature and properties influenced their purpose. However, the games master was disappointed when he asked the prefects to sort the equipment for storage and he couldn't.

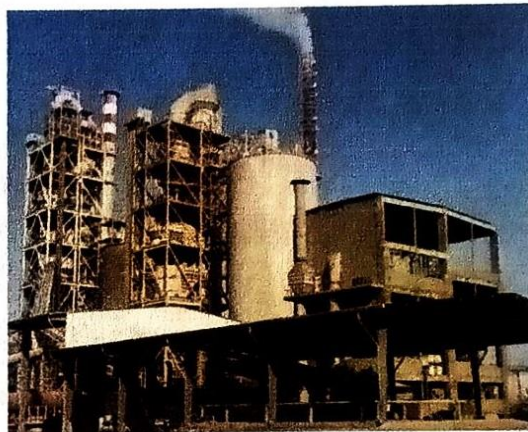
Task

As a student of chemistry;

- (a) Help the prefect with reason categorize the materials.
- (b) State the properties of the materials that influenced their suitability.
- (c) Advise the prefect on the choice of materials for the different equipment.
- (d) What is the impact of the materials on the environment?

32. In most areas, buildings are at a standstill due to unaffordability of cement. Residents of a certain village have been quarrying rocks in their area and were told that the same rocks could form cement.

An investor through the LCV chairperson wants to set up a cement producing industry in the area but this has attracted resistance from many residents. The residents claim ignorance of the entire process and have demanded to be educated for proper decision making.



Task

Using your knowledge of chemistry, make a write up of the expected presentation of the LCV chairperson to the residents covering the process of production, impact on the environment, mitigation and social benefits.

33. The collapse of tall buildings and bridges, has partly been blamed on low grade materials used in construction. The ores for extraction of iron are abundant in Osukuru. A company intends to build an industry in the area and the officials want to meet the residents for an educative talk.

Task

As a chemistry learner, make a write up of what the company officials would present to the residents.

34. Kalonzo a compound cleaner advised students not to burn rubbish on the school compound but seek other means of disposal. This resulted into accumulation of garbage which made the deputy head teacher to intervene and ordered for the rubbish to be burnt. This activity did not go well with the learners in the adjacent classrooms. The lessons were abandoned as the students and teachers sought for safer places.



Task

Make a write up of why Kalonzo could be right in his advice to the students.

35. Kigayaza residents practice stone quarrying to earn a living. The quarry is on school land. The board of governors of the school have deemed it necessary to stop this activity because of its associated challenges. The community feels it is not right for the school authorities to stop them from using the natural resource and have organized through the LCI chairperson for a meeting with the school authorities.

Task

As a student of chemistry, prepare a write up of the presentation you expect the school authorities to deliver to the community covering the identity of the natural resource, its composition, impact on the environment, how it occurs, mitigation and social benefits.

36. A man from the village is not used to brushing his teeth with a tooth paste after a meal every evening and requested to be educated about the underlying facts behind this practice. He felt just washing his mouth with water was sufficient enough to stay clean.

Task

As a chemistry learner;

- (a) State why it was necessary to use a toothpaste.
- (b) Help the man understand how it works.
- (c) Advise the man on the challenges associated with long term use of the paste.
- (d) How does the method compare with the man's way of maintaining clean and healthy teeth?

37. A rich man was in the process of connecting water to his newly constructed residential building. There are various materials he could use for constructing a water tank stand whose nature and properties determine their suitability. However he needs to be advised before buying the materials and has asked a local builder to educate him. The builder decides to come to you for advice.

**Task**

- (a) Use your knowledge of chemistry to explain;
- (b)(i) the nature of materials.
- (ii) The suitability of materials.

(c) Advise the rich man on the choice of materials for use and their impact on the environment.

38. The greatest percentage of rural communities survive on agriculture. The soils have become infertile and crop yields and harvests poor. Food security is dependent on use of artificial fertilizers which are quite expensive. The farmers are considering constructing an industrial plant to manufacture nitric acid that can be used to make a fertilizer with minimum environmental impact.



However most farmers are ignorant about the entire process of production, side effects, mitigation and the social benefits for which they are seeking to be enlightened.

Task

Using your knowledge of chemistry, prepare a write up to address the farmers.

39. A women's group dealing in selling matooke (bananas) and millet have registered heavy losses due to ripening of bananas and germination of millet in storage. A parent who visited the school on the science fare, remembers that a sanitizer which is now on high demand due to red eye infection can be processed from these materials. The parent has consulted the leaders of the women's group and advised them to come to your school for an educative visit.



Task

As a student of chemistry, prepare a presentation of the message the women would use to produce and market the sanitizer.

40. Lwera is a big wet land that has of late been heavily encroached on for sand mining by some investors. The wet land is next to Lake Victoria. The investors use heavy caterpillar graders and trucks and have constructed temporary settlement, fenced off the area from local residents who felt cheated. Besides this, the activity was impacting on the environment. The parliament of Uganda debated the matter and a decision was made to revoke/ stop the activity.

Task

As a student of chemistry make a write up of the presentation the residents must have forwarded to their member of parliament on the natural resource for consideration.

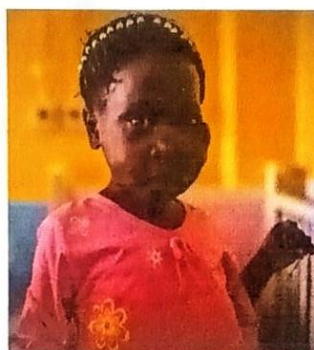
41. In most urban centers, waste management and disposal is a big challenge that has kept the local authorities seeking for solutions. In one slum, some residents pass stool into polythene papers and dispose off in the nearby water channel. Garbage and plastic materials are scattered almost everywhere. This has prompted the local authorities to organize sensitization workshops to address the challenge.



Task

As a student of chemistry, write a presentation of the message you would expect the local authorities to use to sensitize the residents.

42. In most communities signals for television and radio waves have greatly improved but there is a challenge of few cancer screening facilities. The improvement is attributed to the telecom companies building masts which Musungu to a large extent believes is the cause of rising cases of cancer. However before he pursues his intention of taking the companies to courts of law Musungu wants to understand better the product of the masts and why the cancer screening facilities are few.



Task

- Help Musungu understand the categories of products from the masts and those in the medical field
- Explain to Musungu how the products work.
- Advise Musungu on the long term use of the products.

44. Okello while checking on his son's chemistry notes, found drawing of structures that resembled what he studied about planets while in P. 7. He wondered how this becomes chemistry and not geography. He invited his son to clearly explain to him what the drawings meant, their component and properties.



Task

As a learner of chemistry help Okello's son;

- explain to his father what the structures mean
- State the components in the structures and their properties.
- give advice to Okello on the likely uses of the substances A and B
- state the effect on the environment of long term use of substance A

45. Strong basement of a storage building requires the use of iron bars and concrete of appropriate strength to support the weight and avoid collapsing. Low density aluminium is largely used to make lifts, door and window frames. Most of the materials are available in the local market except aluminium which is imported and quite expensive. The ores of aluminium are available in Karamoja district and an investor wants to set up an aluminium extraction industry to support the economy. The LC. V chairperson has welcomed the idea and through a radio talk show wants the investor to sensitize his people on how the mineral can be produced, the impact of the industry and social benefit.



Task

As a chemistry learner make a write up of the presentation the investor is expected to deliver on the radio talk show.

46. Lake Katwe in western Uganda has deposits of a material that can be industrially converted to a product for making a detergent

Fat + sodium hydroxide $\longrightarrow$ soap + glycerol

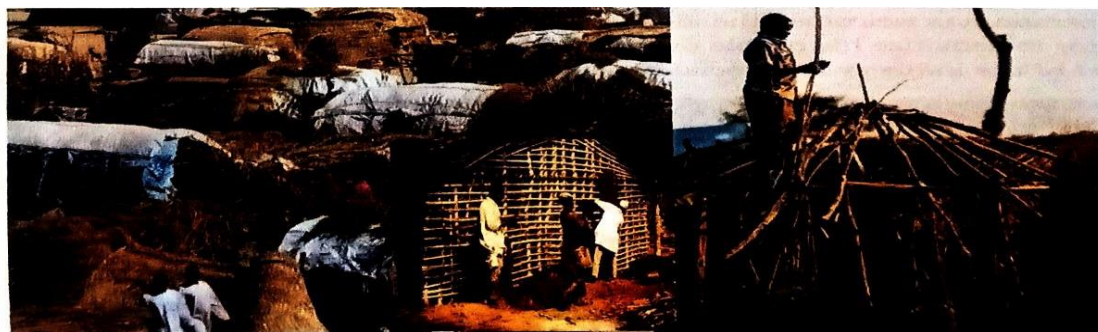
Soap is on high demand but the local communities lack sufficient knowledge of how to produce the alkali for soap manufacturers and asked to be sensitized.

Task

Using your knowledge of chemistry, make a write up of how the product can be manufactured including the impact and benefits of the manufacturing process.

47. A nongovernmental organization dealing with the impact of refugees on the hosting communities in West Nile region, observed a number of challenges that impacted negatively on the natural resources. The refugees carried out activities such as grazing, cultivation, cutting down trees for firewood and charcoal, brick making, molding soil for houses, cutting grass for mud and wattle houses, brewing alcohol and many others. The environment was noisy, dusty with generally poor sanitation, malaria was quite common and poor harvests as the soils are left bare and eroded.

The poor handling of natural resources has caused total environmental degradation and the NGO has organized awareness talk shows to solve the challenges.



Task

As a student of chemistry make a write up of the awareness the NGO officials are expected to present to the refugees and the hosting population.

48. Fishing is a major economic activity in most waters of Uganda. The fisher men use a variety of methods including local herbs and undersize nets for catching fish. Some of the boat engines are old and pour oil in the water. Chemicals like detergents are released directly in the water including some human wastes. Factories around the water showers release hot water and sewage into the water bodies. This has prompted the government to strictly oversee the activity and ensure fish is not contaminated and there is market for it abroad. The head of the unit plans to sensitize the fishermen.

Task

As a chemistry learner help the head of the unit to sensitize the fishermen about the natural resource, how to harvest them, their contribution and impact.

49. Margret participated in serving guests at a S.4 prom party. She discovered that the life style of the elderly and youths was completely different basing on their choices of menu. The elderly guests preferred boiled foods, a fruit and water whereas the youths preferred fried foods and bottled soft drinks of different colors tastes and flavors.



Margret was bothered and wanted to know why the youths had preferences quite unique and similar.

Task

As a learner of chemistry help Margret;

- (a) Categorize the preferences made by the guests.
- (b) To explain how the materials that influenced the youths choice work.
- C) To advise the youths on the long term consumption of the foods and drinks they preferred compared to that of the elders.

50. The organizers of events prefer to use materials that are easy to carry, affordable and effective with less environment impact. They understand that the choices of materials and suitability for use relies on their nature, properties and impact on the environment.



Nambafu one of the event organizers wants the materials categorized with their properties and uses stated so that he can help advice many groups planning to start up catering services.

Task

Using your chemistry knowledge help;

- Nambafu categorize the type of materials the starter of catering services should buy.
- Nambafu explain the suitability of the materials he has recommended to be bought.
- To advise on the choices of the materials recommended.
- State the effect of the disposal of the used materials on the environment.

51. A chemical and fertilizer industry manufacturing Sulphuric acid, phosphate and sulphate fertilizers existed in Osukuru Tororo district. A farmer cultivating near the abandoned mine wants to understand the processes involved in the manufacture of the chemical and the sulphate fertilizer that makes his crop yields and harvests better every season. His fellow farmers are ignorant but know the fertilizer as an ammonium compound made from ammonia.



Task

As a learner of chemistry, help and write a presentation that can be used to educate the farmer.

52. The demand for cheap and clean fuel is ever rising and some residents have embraced charcoal burning as a serious economic activity though it also has a number of challenges. Charcoal is affordable and the raw material is renewable. Kiwule inherited a forest from his father and wants to sustainably cut some trees for charcoal but does not know exactly how wood is turned to the fuel.

Task

Using the knowledge from chemistry help Kiwule understand the process involved in production of the fuel.

53. Pius rears animals and also practices agroforestry. His land extends to the river and has planted trees close to the river banks. His neighbor carries out similar activities but was evicted out of his land close to the river because unlike Pius he planted trees on highland and cultivated in the river shores. Pius could not face each other with his neighbor who claims that Pius has planned for his downfall leading to his eviction from the fertile soils close to the river banks. Pius needs somebody to explain to his neighbor why his eviction by the environment officer was a right move and he should take it in good faith.

Task

Using your knowledge of chemistry make a presentation Pius would expect to convince his neighbor about the just action taken against him by the environment officer.

54. John was surviving on church land. He built a temporary grass thatched house in which he slept together with his goats and poultry. John received a visitor who spent a night in his house. The visitor advised his host to quickly save himself from dying early and build another house for the animals and cooking. John felt insulted and wondered whether people who live in two houses do not die at tender age.

Task

Present a write up that you would use to convince John that it is right to live in separate houses with animals as well as cooking.

55. Ms. Balanda has a restaurant in Iganga Town. The customers have these days abandoned her restaurant because of poor taste of food, unpleasant scent and food gets spoilt after a very short time. The appearance of cooked food is also not attractive and the soup is always too dilute. She wishes to acquire different substances which would be added to her food to produce meals attractive to her customers. She has contracted you as a chemistry student well knowing that you can advise her on the right products /substance to buy.
(Support material)



Task.

Write a piece of advice to her on: -

- Category of the substance/product
- Uses of the different substance/product
- Side effects of using the different products/Substances on customers and mitigation.
- Evaluation of the substance/product.

56. Mayuge District local Government has planned to create Jobs for Jobless youth by setting up an industry that makes Kitchen Utensils. However, they do not know the various materials and their properties that can be used to make the items. The district has contacted the chemistry department of your school to advise them on what elements /substances to be used as raw materials.

Support materials



Task:

As a chemistry student who has learnt about periodic table, write a presentation you would give upon invitation being selected by the head of department.

- a) On the category of elements [substances
- b) Suitability of the element/substances.
- c) Choice of the element/substance
- d) Impact of the elements/substance on the environment and mitigation.

57. In some districts of Uganda like Tororo district, farmers get very low crop yields due to poor soils that has led to persistent famine in the area. Ammonium nitrate is one of the effective fertilizers used to improve crop yields. The ministry of agriculture and animal husbandry has entrusted an investor to put up an ammonium nitrate production plant in Tororo district such that the fertilizer is got at cheap cost. However, the community near the site is worried about its effects on the environment and how the environmental process will occur.

(Support Material).



The head of department has appointed you to sensitize the community.

Task:

Prepare a presentation you will make during the meeting.

58. Kaliro sugar factory which has just been setup is disposing off morasses which would be used to make ethanol. Ethanol is at a high demand and it's used to make essential substances like sanitizer. The locals around are making ethanol on small scale and it cannot meet the demands. However, the government is planning to set up an industry to produce ethanol with minimum environmental impact.

Support material)



However, the community would like to know the process of production and how it would be carried out.

Task:

As a chemistry student, make a write up you will present to the community members

PREPARED BY WILSON NGAMBO @ 0779806613/ 0758077371

59. The setup of crude oil mine in Hoima district resulted in displacing of residents to other places but the displaced people are still not contented. This has made the government to intervene.

(Support material)



The government is planning to sensitize the residents through workshops in the district.

Task:

As a chemistry student prepare a short presentation you will deliver during the workshop upon invitation.

60. In Masese Division Jinja city some residents near the lake are involved in certain activities like rearing animals, growing crops, distillation of ethanol and washing clothes from lake banks. Recently it has been discovered that the fish has started dying and people who use the water for bathing develop rashes. This has attracted the attention of officials of the ministry of health and have been invited for discussion to u-y and discover the causes of what is happening.

(Support material)



A sensitization workshop is to be conducted to explain the existing situation in the area. The theme of the workshop is **MY ENVIRONMENT MY RESPONSIBILITY**.

Task:

As a chemistry student, write a presentation.

61. Iron (II) sulphate (FeSO_4) is a salt found in tablets given to pregnant women who appear pale due to having a certain element in insufficient amounts in their bodies. This salt can be prepared in the laboratory by reacting a certain metal in excess amounts with a dilute acid.

a) Name the

i) Acid used.

ii) Metal used.

b) Explain why the metal used should be in excess.

c) State the deficiency disease that requires administration of the above tablets.

62. The atomic numbers of atoms of elements **M**, **R** and **W** are 7, 13, and 17 respectively. **M**, **R**, and **W** are not the usual symbols of the elements in the Periodic Table.

a) Umar, a local electrician in Kisoro wants to select an element to be used for his job.

i) Which of the above elements can he use?

ii) Suggest **two** reasons to support the choice of your answer in (i) above.

b) **Two** of the above elements belong to the same period in the periodic table.

i) Write the symbols of these **two** elements.

ii) Suggest a reason for your answer in (i) above.

63. Charcoal (C) and ethane (C_2H_6) are some of the substances that are good sources of fuel in homes and factories.

a) What is a fuel?

b) Write a chemical equation for the complete combustion of ethane.

c) Suggest the **disadvantage** of excessive use of the above fuels to the world.

d) A Village Health Team (VHT) in Kasambya, Kyotera is always advising his people to avoid cooking using charcoal stoves while inside rooms with closed doors and windows. Suggest a reason for the VHT's advice.

64. The observations made when some metals were allowed to react with water are shown in the table below

Metal	Observation
A	No observation with water nor steam
E	Vigorously react with cold water
T	Fairly react vigorously with cold water
X	Very slow reaction in water but fast when heated in steam

a) Identify the metal which is

- i) Most reactive
- ii) Least reactive

b) Arrange the above metals in order of decreasing reactivity.

c) Giving reason(s), suggest which of the above metal(s) can be used to make a tank for storing water in your school.

- i) Metal(s)
- ii) Reason(s)

65. Ethanol is an organic compound that belongs to a homologous series of compounds called alcohols, having the general formula $C_nH_{2n+1}OH$, where $n \geq 1$.

a. Write the molecular formula and the name of any other **two** members in this homologous series.

Molecular formula	Name

a. Ethanol may be used as a fuel. Write a chemical equation for the complete combustion of ethanol.

b. Describe how each of the chemical products of the reaction in (b) can be tested in the laboratory.

66. (a). Mukwano bar soap is one of the soaps that can be prepared by boiling palm oil and a substance Y and after which sodium chloride is added to the boiled mixture.

i) What is the role of sodium chloride?

ii) What name is given to the process leading to the formation of soap?

b) Water collected from the borehole (**T**) and also that freshly harvested in tanks from rain (**Q**) can be used to wash clothes with the help of soap. One of these two (**T** or **Q**) requires more soap to form lather.

i Which one of the above requires more soap to lather?

ii Suggest what can be done to the water in (i) above such that it can also requires less soap to lather.

67. The full symbols of atoms of elements **J**, **L**, **V**, and **Z** are

${}^{16}_{8}\text{J}$, ${}^{20}_{10}\text{L}$, ${}^{27}_{13}\text{V}$, and ${}^{32}_{16}\text{Z}$ respectively

a. Which one of the above elements is a noble gas?

b. (i). State **two** elements that can react together to form a compound which is a solid at room temperature, soluble in water and can conduct electricity when it is only in molten form or aqueous state and not when in solid state.

(ii). State the reason why the compound formed by the elements in (i) can only conduct electricity in molten form or aqueous state but not in solid state.

c. State **two** elements which can react together to form a substance which is a gas at room temperature

68. Most of the youths in Kampala depends on the fast foods prepared by peasant ladies for breakfast and lunch. They say the food has a nice aroma, the food can stay for some time when kept hence attracting them. On a certain day one the youths got stomach upset and decided to use paracetamol tablets for relief.

TASK:

Use your chemistry knowledge to;

Explain

(i) Categories of the products used.

(ii) The suitability of the products.

(iii) What are the side effects of using the products?

(iv) How can these side effects be mitigated.

69. Ntakirutimana was sent to buy paraffin from a nearby petrol station. On reaching home a young sibling of Ntakirutimana thought it was water and poured it in the jerry can containing some water. He realized that he has to take the paraffin to the mother who wanted to use it for cooking in the stove. The mother realized that the paraffin had water.

TASK.

As a chemistry student;

- (a) Explain to Ntakirutimana how the paraffin can be recovered from the water.
- (b) Show the difference between the paraffin Ntakirutimana got from the petrol station and the paraffin He took to mother.
- (c) Give the impact of using the paraffin to the environment.

70. Recently there is a lot of metal fabrication workshops which has provided youths with jobs. In these workshops, they mainly use metals made of iron and this has led to scarcity of iron. Government in response decided to give a local investor to set up an iron production plant in Lira where the materials needed to make iron were recently discovered. However, the community is concerned about its environmental effects, how they will benefit from the plant and how the process will occur.



The head of department chemistry has appointed you to sensitize the other learners.

TASK

Prepare a presentation you will make during the meeting.

71. Due to improved standards of living most people in Kasese district have resorted to building their own houses. Most of the materials required to build are present but there is inadequate cement in the hardware stores in the place. In Kasese there is all the raw materials that can be used to make cement. The local leaders decided to start up a cement factory that can solve the problem but with minimal environmental impact.



However, the science club members in your school would like to know how the process of production will be carried out.

Task:

As a chemistry student, make a write up you will use during the presentation.

72. Part of Lubigi swamp in Busega village has been greatly encroached by people for farming, settlement and other human activities. This has attracted the attention of environmentalists from different government bodies such as NEMA, NFA among others.

The environmentalists are planning to create awareness to the people of Busega village through sensitization workshops organized in different cells of the village.



Task

As a chemistry student, prepare a short presentation you will deliver during the workshop.

73. Ntandi village in Bundibugyo district is found at the foot of Mountain Rwenzori and in Ssemuliki forest. People in this village mainly they get income from charcoal burning, rearing of goats and cocoa growing. Recently there is a dry season and when it rains there is a lot of floods in the area, this has led to the goats dying, loss of property due to heavy floods and the Ssemuliki river where they get water for domestic use have started to dry up. The illiterate locals are now wondering why all these are happening even some of them are saying their village is be witched.



A sensitization week is to be organized in the village to explain the existing situation. The government officials have decided to use the theme “My forest my responsibility, my River our responsibility.

Task

As a chemistry student, write a message you will deliver upon invitation.

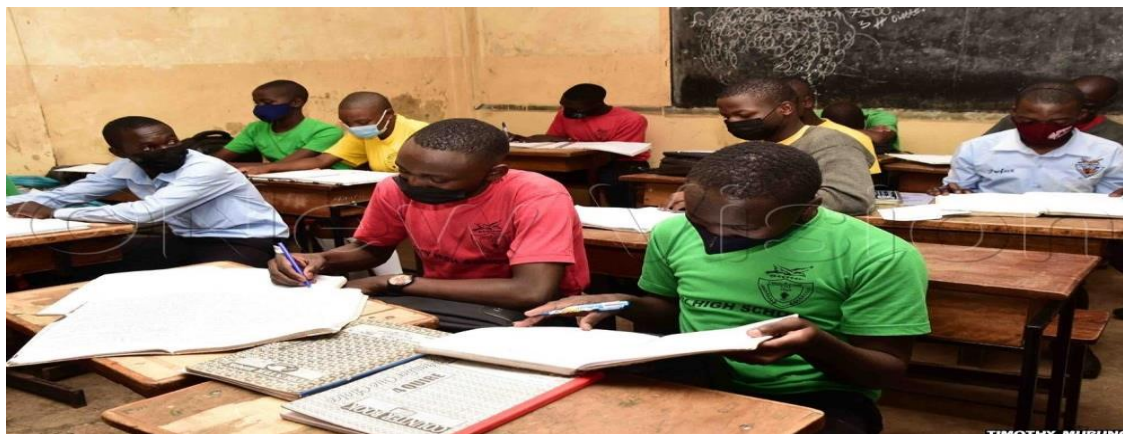
74. During his free time, Mutebi decided to visit the Chemistry Laboratory at their school with rock salt (commonly known as “Ekisula” in Luganda). Upon reaching there, he added water to the rock salt, stirred the mixture and common salt was able to dissolve forming a solution while the impurities which were insoluble remained.

Task:

As a chemistry literate,

- Cite the name of the technique Mutebi would employ to obtain pure common salt from the above extract.
- Generate the principle behind the technique cited in (a) above.
- Help Mutebi to come up with the chronological steps he would follow using the above cited technique in order to come up with pure sodium chloride at the end of the experiment.

75. While in class, Edward attentively listened to their Chemistry teacher as he explained about the formation process of rocks. In his explanation, the teacher explained that plants, water, wind and change in temperature can all contribute to soil formation. This information however proved to be sketchy and left Edward staring at all the colleagues in class.



Edward only believes that it is change in temperature that can contribute to soil formation and he has decided to approach you for further explanation in absence of the teacher.

Task:

As a wise chemistry student that understood the chapter of rocks and minerals:

- (a). Explain to Edward how plants, water and wind can contribute to soil formation.
- (b). Further help Edward to identify the various rock types that exist in nature and how each of them is formed.

76. One of the main reasons for carrying out a chemistry scientific investigation in the Laboratory is to come up with empirical evidence on how certain chemical processes end. However, the task is not an easy one as it involves a number of steps one should follow in order to come up with the final findings. Each of these steps is pivotal and has a number of importances in general. Most of your fellow students have found a challenge in identifying the purpose of each of the steps.



The Dean of Sciences in your school has chosen you to expound more about the matter to your fellows.

Task:

Prepare a mind map that you will use while making your presentation to the plenary.

77. In Katanga village, a number of people have continuously dressed clothes made out of a number of materials. In majority of the cases, these clothes have become dirty rising need for them to be washed. The residents in the village have continuously used Muzaana bar soap during the washing exercise but the clothes have continued to remain stained with the water failing to produce foam. Their challenge is that majority of them are uneducated and thus unable to know why such a condition has continued to persist.

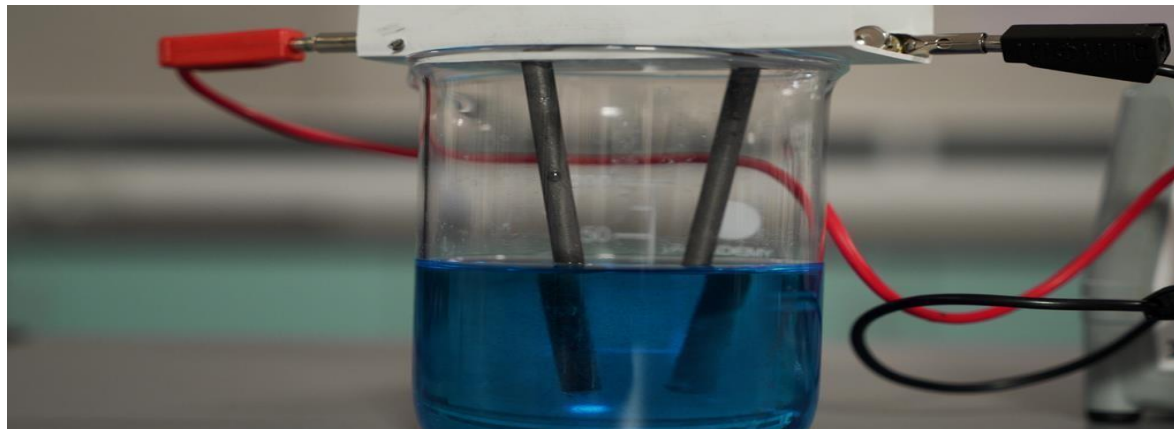


The science department in your school is planning to organize a community outreach to the residents of Katanga village and you are meant to give a speech on the D-day.

Task.

Prepare a presentation you will make during the outreach.

78. Uwimana is a student at Emma high school in bushenyi. In one of the chemistry lessons he missed, their chemistry teacher explained about Electroplating and how important the process is. In his explanation, he used a five hundred shillings coin and a one hundred shillings coin, both of which he connected to the terminals of the cell and left the completed circuit to settle for about 10 to 15 minutes. At the end of the experiment, the five hundred shillings coin had reduced in size and the one hundred shillings coin became tinted with a brown colour. The challenge Uwimana has is that he has failed to understand how this process occurs and its applicability in the daily life.



Task:

As a chemistry student that understood the concept, write a message you will deliver to Madiba.

79. A certain community in Odongkara village in Northern Uganda predominantly depends on cassava as one of their staple food and source of livelihood. This community developed a habit of obtaining a particular quality of cassava flour by storing fresh cassava tubers in cold water until they turned soft. The soft tubers were peeled, dried and made into flour. A neighboring immigrant community was shocked by this practice. They never believed it that any conditions cooler than ordinary room temperature could ever cause any such change or reaction in fresh cassava tubers. This is because the immigrant community had a tradition of preparing cassava flour by warming peeled cassava tubers in the sun for about two to three days depending on the light intensity. Warmed tubers are then piled and kept at an even higher temperature to ferment the tubers before dried flour would be obtained. If temperature extremities are not provided, the tubers would never ferment. The resulting cassava flour after fermentation had a totally different quality and taste from that of the indigenous community. The immigrant community accused the indigenous Odongkara community of using evil spirits in cool water sources to cause reactions that can soften fresh cassava tubers to obtain flour. They claimed that the flour was evil.

**Task.**

The local leaders have requested you to prepare a written sensitization message that will help them to solve the dispute about use of evil spirits that cause reactions to occur at a low temperature.

80. Upon getting borehole water and on their way back home, John and Peter slipped, fallen down and their white shirts became dirty. John decided to use a detergent **A** to clean his shirt but it remained with some brown stains despite rinsing it many times. Peter also used another detergent **B** and his shirt was cleaned with in one rinse.

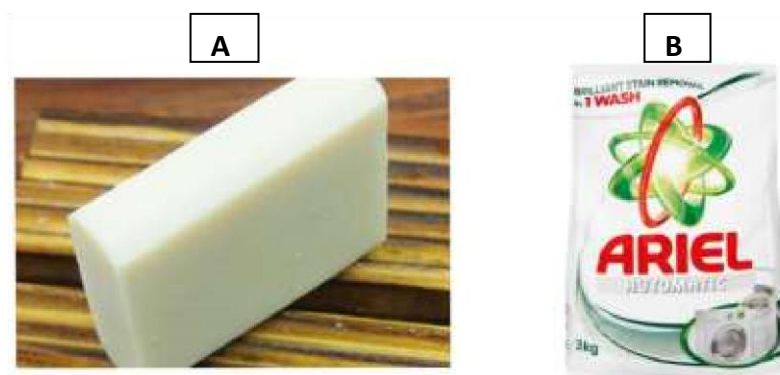


Fig 1. Shows detergents used by John and Peter to wash their shirts.

Task:

As a chemistry learner;

- (a) Explain
 - (i) The categories of products used by John and Peter.
 - (ii) How the products work and the challenges associated with the long term use of the products.
- (b) Evaluate the products.

81. The Uganda Civil Aviation Authority has hired an engineering company to reconstruct the recently damaged bombardier aircraft body. The chief engineer of the company wants to reconstruct a new, good and strong bombardier aircraft body.



However the chief engineer knows that he has to choose the right material to be used with suitable qualities and properties and thus he has come to you for advice.

Task:

Use your chemistry knowledge to;

- (a) Explain
 - (i) The category of the material the engineering company will use
 - (ii) The suitability of the material
- (b) The impact of the material to the environment.

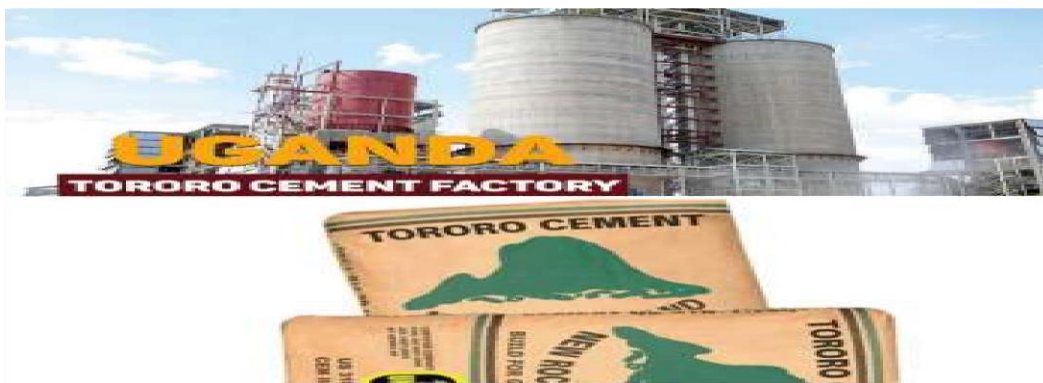
82. Ammonia is used on a large scale to manufacture fertilizers which are highly needed by the farmers. In an attempt to continue supporting the country's agricultural sector. The government is seeking to ensure a steady availability of ammonia and thus has hired an investor to set up an ammonia production plant with minimal environmental impact in Kitambala town.

However the town community would like to know how the production process will be carried out and how will they benefit from this plant.

Task:

As a chemistry student, make a write up you will deliver during presentation.

83. Cement is one of the ingredients required for constructing good and strong houses. Following the increased demand for cement due to increased need for human settlement, the government has hired a local investor to construct a new cement manufacturing factory in Tororo district to ensure an increased supply of cement countrywide.



The district locals are concerned about the environmental effects that will result upon construction of the factory in their district and how the production process will be conducted.

Task:

Prepare a presentation you will make answering the concerns of the locals.

84. Following the recent discovery of some of the natural resources in the Albertine region, many people have started encroaching onto the land of this region by clearing trees to create space for settlement and charcoal burning and also the water of Lake Albert is exponentially deteriorating. This has attracted the officials of Hoima district environment management authority.

The officials want to sensitize people in the Albertine region about environment conservation through a workshop.



Task:

As a chemistry learner, prepare a short message you will deliver upon invitation to the Workshop.

85. Abiti and Auma were both suffering from a sickness and Auma was also feeling a headache. They were both diagnosed with a certain bacterial infection and thus they rushed to a pharmacy where Abiti bought a certain medicinal drug and his sickness later healed, Auma bought another type of medicinal drug but only the headache healed and the sickness persisted.



Task:

As a chemistry student;

- Identify the categories of the drug products used by Abiti and Auma.
- Explain to Abiti and Auma the dangers associated with the drug products.
- Evaluate the products used by Abiti and Auma.

86. While investigating the reaction of period 3 elements with water, Juma first considered two elements **A** and **B** and the results of their reaction with water is summarized in the table below.

Element	Observations
A	Reacted violently while floating on surface of cold water forming an alkaline solution with evolution of hydrogen gas.
B	Reacted slowly with cold water forming an alkaline solution and hydrogen gas but when heated with steam formed a white solid and hydrogen gas

Task:

As a chemistry learner;

- Give the category of elements **A** and **B**.
- Predict the reaction of other elements in period 3 with water.
- Advice Juma about the dangers associated with the reaction of these elements with water.

87. One of the large scale use of Sulphuric acid is to manufacture paints. Due to increased demand of paints countrywide, the government is seeking to ensure that there is a steady supply of Sulphuric acid to be used to manufacture the needed paints. The government has hired an investor to set up a Sulphuric acid manufacturing plant in Kimu town.



The locals of Kimu town are concerned about how the production process will be conducted, its environmental effects and how will they benefit when the plant is constructed in their town.

Task:

Prepare a presentation you will make answering concerns of the locals.

88. Rocky ores found in Kiremu district are found to be rich in iron, a mineral used to make steel bars. The government has cleared a local investor to set up an iron extracting plant to extract vast quantities of iron from the rocky ores with minimal environmental impact. However, due to inadequate resources, the local investor has promised to first extract the iron in its impure form which the government accepted.



The district officials would like to know how the extraction process will be conducted and how the plant will impact their area.

Task:

Prepare a short message you would tell one of the officials concerning the plant

89. Jombo is a swampy village with a forest reserve on its hill side. People of this village have for a long time cleared the swamps for settlement, rice farming and dumping of human waste as well as cutting down trees from forest reserve for charcoal burning. This has attracted the attention of the officials who are seeking to create awareness about conservation of the village environment through a radio talk show.



Task:

As a chemistry student, prepare a short message you would like to be delivered by one of the officials on the radio talk show.

90. There has been a rise in destruction of natural resources countrywide for the last ten years and this has attracted the attention of officials from National Environment Management authority (NEMA).

The officials are planning to sensitize the people countrywide about sustainability of natural resources through a national wide television broadcast.



Task:

As a chemistry learner, prepare a write up you would deliver upon invitation to be one of the presenters on the national wide television broadcast.

91. Kawuki lives along the channels of a water body which supplies the entire village of kajabijo with water. He has many cows which drink and move within the water body. He has a big plantation of crops next to the water body on which he uses a massive amount of fertilizers to ensure that he get high yields. He normally cools his machines in water and his wife earns a living by washing clothes daily for people in kajabijo. The wife uses detergents and soap to wash the clothes.



Write a piece of advise to Kawuki letting him know about the ways his family and activities pollute the water body, the possible effects the pollution could do to kijabijo and how he can participate in solving the problem of water pollution in the area.

92. An agribusiness company in Uganda organized a washing competition which was held in Walukuba division, Jinja district in order to evaluate its products. Two ladies were each provided with a full jerry can of borehole water, a basin and a stained cloth. One lady was provided with detergent **A** another with detergent **B**. Mrs. Menha, the usual annual winner of the competitions used detergent **A** to clean the cloth but it remained with some dirty marks even after rinsing it several times. Mrs. Kirunda used detergent **B** and won the race as she cleaned the cloth with one rinse. Mrs Menha was frustrated and could not understand what went wrong this time round.

Task;

- a) As a chemistry learner,
 - i. Explain categories of products, **A** and **B** used by the two ladies.
 - ii. Help Mrs. Menha to understand how the product works.
- b) Advise the two ladies on the challenges associated with the use of the products.

93. Peter's father died before completing the construction of their house. Mainly doors and windows are missing, so Peter is in the process of making good and strong window and door frames for this house without affecting the environment. He is aware that there are various materials on the market for making window and door frames. He also knows that in order for one to produce good quality frames and windows; he should select the right material with suitable qualities and properties. However, he is still confused with the choice and has approached you for some advice.

Task;

Use your chemistry knowledge to:

- a) Explain
 - i. The categories of the materials.
 - ii. The suitability of the materials.
- b) Advise Peter on the choice of the materials.

94. People in most remote villages of Uganda often suffer from scarcity of some synthetic products. Sometimes their only available suppliers hike prices for these products. A women's group in Kisoga village, Mukono district is planning to manufacture a soapy detergent as a new business project to reduce on their expenses and to increase their annual gross sales. The group is planning to set up a soapy detergent production plant with minimal environmental concerns in this village.

Some locals of this village are also complaining that their valuable land is about to be taken up by these women in order to set up their production plant. However, the science club members in your school would like to know how the process of production will be carried out.



The head of science club has appointed you to sensitize the club members.

Task;

Prepare a write up that you will use during the presentation.

95. Air is a mixture of different components. It contains 21% oxygen. Due to a wide spread of respiratory illnesses caused by COVID-19, there was an increased demand for oxygen by patients in hospitals. The government supply of oxygen is not enough and is planning to set up an oxygen production plant with minimal environmental impact.



However, the science club members in your school would like to know how the production process will be carried out.

Task;

As a chemistry learner, prepare a write up you will use during the presentation.

96. People of Kigaragara village in Isingiro district can easily cross into Tanzania for charcoal business. Due to increase in population of this district, many natural forests have been cleared to provide charcoal for use as fuel and natural swamps have been reclaimed to create space for settlement. These happenings have left the district officials wondering. As a result, the government through the district officials is planning to create awareness to the people in Isingiro District through sensitization workshops organized in different villages.



Task;

As a chemistry learner, prepare a short presentation that you will deliver during the workshop when invited.

97. Kagulu village in Buyende district is developing at a faster rate. Many of the recently existing swamps and forests are now filled with buildings. Stone quarrying is the order of the day among most the locals in the village. Recently the wells have started drying up and yet the little water available is not fresh. The few residents that practice crop husbandry also say that seasons have changed and this has caused famine in the area. All these happenings have left many of the residents wondering.

A sensitization workshop is to be organized in the district by the government through National Environment Management Authority (**NEMA**).

Task;

As chemistry learner, prepare a brief presentation you will deliver upon invitation.

98. Semuku staying deep in a village is well known for his perfect Agricultural practices. He keeps poultry and goats on a large scale which made him earn an income worth 10 million shillings in the month of June, 2024. He has always loved to stay in town and so on receipt of the money, he run fast and he was able to buy a small plot of land in Kampala city, Where he is residing now. Semuku loves Agriculture so much and he wants to set up a poultry farm on his new plot in town but he lacks knowledge of using small piece of land as he has been used to free range system of poultry rearing in village.

Task. As a chemistry learner with the knowledge of Materials,

- a) Explain to Semuku on the categories of the materials he will use to set a strong poultry farm without affecting the environment.
- b) Describe to him the suitability of the materials chosen and how he can use the materials to set up the farm.
- c) Evaluate the choice of the materials chosen.